

# **Wetland Mitigation Monitoring Report for the FAS 67 (Stagecoach Trail) site near the Galena River bridge, Jo Daviess County, Illinois (Second monitoring year--2000)**

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## **Summary**

Based on observations made during the 2000 season, the following is a summary that relates the likelihood that the compensation site will meet each goal within the five-year monitoring period. The goals, objectives, and performance standards follow those outlined in the IDOT monitoring request (16 March 1998)(EnCAP 1995).

Project goal: To create an herbaceous wetland and upland buffer on a 9.7-acre site.

Hydrophytic vegetation dominates throughout the wetland creation site, and wetland hydrology is becoming apparent, but hydric soils have yet to develop on much of the site. Some incoming water had been diverted, but the flow is reportedly restored. Vegetation that colonized the created site is dominated by native species, and planted species are spreading. Efforts to control *Phalaris*, *Typha* and *Salix* are evident from visual observation and vegetation sampling, but should be continued in order to meet project goals. The buffer around the wetland contains a number of planted trees, but evidence of the growth from the seeding of prairie plants in the buffer area was not observed.

## **Introduction**

This report details the second year of monitoring of an excavated wetland created to mitigate for wetlands affected by the construction of the FAS 67 (Stagecoach Trail) bridge over the Galena River (Burton's Bridge)(legal location: NE/4, SE/4, sec. 16, T.28N., R.1E., Galena 7.5 minute quadrangle). The wetlands affected were located in the path of the new bridge corridor, south of the former bridge (Tessene and Harrold 1994). Earthwork for the mitigation site was completed in 1998, with the recommendation that topsoil be returned to the excavated area from the excavation and the affected wetlands in order to provide a medium for the growth of wetland plants and a possible seedbank. Plantings of herbaceous species consistent with the desired wetland vegetation were also established; plant cover in these established cells was monitored by Steve Lorig of Midwest Ecological Services, Inc., on September 14, 1999 (Lorig 1999).

This report discusses the goals, objectives, and performance criteria for the mitigation project, the methods used for monitoring the site, monitoring results, and discussion and recommendations. Methods and results are discussed for performance criteria for each goal.

## **Goals, Objectives, and Performance Criteria**

The goals, objectives, and performance criteria described below follow those listed in the request to monitor the site (Tom Brooks, IDOT, 16 March 1998). Each goal should be attained by the end of a five-year monitoring period.

Project Goal 1: The created wetland community should be a jurisdictional wetland as defined by current federal standards.

Objective: The created wetland will be formed through excavation in a 9.7-acre former pasture, to compensate for wetland loss and degradation to approximately 3.5 acres of wetland, including 3.2 acres with good quality.

Performance criteria:

- a. Predominance of hydrophytic vegetation: More than 50% of the dominant plant species must be hydrophytic.
- b. Presence of hydric soils: Hydric soil characteristics should be present, or conditions favorable for hydric soil formation should persist at the site.
- c. Presence of wetland hydrology: The area must be either permanently or periodically inundated at average depths less than 2 m (6.6 ft) or be saturated to the surface for at least 12.5% of the growing season.

Project Goal 2: The created wetland community should meet standards for floristic composition and vegetation cover.

Objective: A sedge meadow/emergent wetland will be created by (1) returning topsoil from the excavation site and the wetlands affected by the bridge construction, (2) planting suitable wetland plants from available nursery stock, and (3) allowing natural colonization from the surrounding area.

Performance criteria:

- a. Planted species survivorship: At the end of the five-year monitoring period, at least 50% of planted species will be living.
- b. Native species abundance and cover: At the end of the five-year monitoring period, at least 75% of the area in the planned wetland should be covered by persistent hydrophytic vegetation. In the first year, percent coverage should be at least 15%. Native plants should be at least 50% of total species at the end of five years, at least 10% in the first year.
- c. Dominant plant species: None of the three most dominant plant species in the planned wetland should be non-native species.

Project Goal 3: The buffer area around the constructed wetland should meet standards for floristic composition and vegetative cover.

Objective: Prairie vegetation will be established on the buffer around the wetland site. Trees will also be planted around the edges of the site nearest the bridge.

Performance criteria:

Native species abundance and cover: Native perennial, non-woody species will continue to be the predominant species in the prairie planting. Planted trees will show suitable survival.

## Methods

### Project Goal 1

#### a) Predominance of hydrophytic vegetation

The method for determining dominant hydrophytic vegetation at a wetland site is described in the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987), based on areal coverage estimates for individual plant species. Each of the dominant plant species is assigned its wetland indicator rating (Reed 1988). Plant species rated facultative or wetter (FAC, FAC+, FACW, or OBL) are considered hydrophytes. If more than 50% of the dominant species present are hydrophytic, this criterion of wetlands is met.

#### b) Occurrence of hydric soils

To monitor hydric soil development, the soil was sampled in 1999 and 2000. Soil profile morphology, including horizon color, texture, and structure was analyzed at representative points throughout the site. Additionally, the presence, type, size, and abundance of redoximorphic features were recorded. In the absence of hydric soil indicators, hydrologic data can be used to confirm that conditions favorable for hydric soil formation persist at the site. (Environmental Laboratory 1987).

#### c) Presence of wetland hydrology

Indicators of wetland hydrology include, but are not limited to, drift lines, wetland drainage patterns, sediment deposits on leaves, watermarks on trees, and visual observation of inundated or saturated soils (Environmental Laboratory 1987). The Illinois State Geological Survey established monitoring wells only in September 1999, so data for water table depths were not available the first year of monitoring (Fucciolo *et al.* 1999). However, they did have records of observations of site inundation. Surface and ground water were monitored monthly by ISGS personnel (Carr and Weaver 2000).

### Project Goal 2

#### a) Planted species survivorship

Lorig (1999) assessed each of the 111 planting areas scattered throughout the site for the survival of planted species. He assigned numbers to each planting cell, determined total plant cover in each cell, assessed the general health of the planting beds, listed the planted species represented by living individuals, and estimated how many plants would be needed to restore each planting cell to its intended level of cover of 75%. Table 1 lists the 14 species planted at the wetland construction site in May 1999. In 2000, cursory visual assessments of the planting areas were deemed sufficient to determine their general health, for the planted species had spread outside their original plots, which were enclosed in fencing at establishment to lessen herbivory by geese.

Table 1. Species planted in plant cells at the Galena River wetland creation site (from Lorig 1999).

|                                 |                             |
|---------------------------------|-----------------------------|
| <i>Alisma plantago-aquatica</i> | <i>Asclepias incarnata</i>  |
| <i>Calamagrostis canadensis</i> | <i>Carex comosa</i>         |
| <i>Carex hystericina</i>        | <i>Carex stricta</i>        |
| <i>Carex vulpinoidea</i>        | <i>Eupatorium maculatum</i> |
| <i>Iris versicolor</i>          | <i>Juncus torreyi</i>       |
| <i>Leersia oryzoides</i>        | <i>Scirpus cyperinus</i>    |
| <i>Scirpus validus</i>          | <i>Spartina pectinata</i>   |

- b) Native species abundance and cover, and  
c) Dominant plant species

A complete survey of the excavated wetland basin was performed to tally all naturally occurring plant species present. Planted species that had spread beyond their planting areas by seed and/or vegetative increase were also included as natural vegetation.

Systematic plant sampling was also conducted during the survey of the site, using transects established at 25 m (82 ft) intervals parallel to the railroad tracks; 0.25 m<sup>2</sup> quadrats were placed at 25 m (82 ft) intervals along each transect. Cover of all species in each plot was assigned a cover class (Table 2) (Daubenmire 1959). Frequency (proportion of quadrats where a species occurred) and average cover (calculated using midpoints for each cover class) were used to compute relative frequency (frequency of a species relative to total observations) and relative cover (cover relative to total observed cover), respectively. These two relative values were averaged to determine the Importance Value for each species sampled.

Table 2. Cover classes used in vegetation sampling.

| Cover Class | Range of Cover (%) | Midpoint of Range (%) |
|-------------|--------------------|-----------------------|
| 1           | less than 5        | 3.0                   |
| 2           | 5-25               | 15.0                  |
| 3           | 25-50              | 37.5                  |
| 4           | 50-75              | 62.5                  |
| 5           | 75-95              | 85.0                  |
| 6           | 95-100             | 97.5                  |

Included with the assessment of a site is the site's Floristic Quality Index, as described by Swink and Wilhelm (1994) and Taft *et al.* (1997). Although the Index is not a substitute for quantitative vegetation analysis in assessing plant communities, it provides a measure of the floristic integrity or level of disturbance of a site. Each plant species native to Illinois is assigned a rating between 0 and 10 (the Coefficient of Conservatism) that is a subjective indicator of how likely a plant may be found on an undisturbed site in a natural plant community. A plant species that has a low Coefficient of Conservatism (c) is common and is likely to tolerate disturbed conditions; a species with a high c is relatively rare and is likely to require specific, undisturbed habitats. Species not native to Illinois are not rated.

To calculate the Floristic Quality Index (FQI), first compute the mean c value ( $\bar{c}$ ),  $\bar{c} = (\sum C)/N$ , where  $\sum C$  represents the sum of the numerical ratings (c) for all species native to Illinois recorded for a site, and N represents the number of native species on the site. The c value for each species is shown in the species list for the site. The FQI of each site is determined by multiplying the mean c value by the square root of N ( $\bar{c} \sqrt{N}$ ) (equivalent to  $\sum C/\sqrt{N}$ ). An Index score below 10 suggests a site of low natural quality; below 5, a highly disturbed site. An FQI value of at least 20 ( $\bar{c}$  above 3.0) suggests that a site has evidence of native character and may be considered an environmental asset.

### Project Goal 3

Observations were made to determine the presence of prairie plants scheduled to be installed in the buffer area. Planted trees were inventoried and assigned to species.

## Results and discussion

### Project goal 1

#### a) Predominance of hydrophytic vegetation

Dominant plant species for the created wetland are listed in Table 3. All of the dominant species are hydrophytic. A full list of plant species observed is presented in the wetland determination form at the end of this report (Appendix 1).

The herbaceous species that colonized the site are dominated by taxa that tolerate or even thrive under disturbed conditions, such as the original site excavation and periodic, prolonged inundation. *Rumex* is the only perennial in the four most common species sampled in 2000, and non-native at that. Still, most species found in the created wetland are native hydrophytes, and a majority of them are perennials as well. Thus, this will likely have no long-term effect on the species composition of the site.

Table 3. Dominant plant species by stratum and wetland indicator status.

| <u>Dominant Plant Species</u>    | <u>Indicator Status</u> | <u>Stratum</u> |
|----------------------------------|-------------------------|----------------|
| 1. <i>Bidens tripartita</i>      | FACW                    | herb           |
| 2. <i>Eleocharis erythropoda</i> | OBL                     | herb           |
| 3. <i>Polygonum hydropiper</i>   | OBL                     | herb           |
| 4. <i>Rorippa islandica</i>      | OBL                     | herb           |
| 5. <i>Rumex crispus</i>          | FAC+                    | herb           |
| 6. <i>Salix exigua</i>           | OBL                     | herb           |

#### b) Presence of hydric soils

The USDA soil survey for Jo Daviess County (Tegeler 1996) indicates that the Dorchester silt loam (occasionally flooded), a moderately well drained Typic Udifluent with a buried A horizon, is found in the northernmost portion of the site. The Huntsville silt loam (frequently flooded), a well drained Cumulic Hapludoll, was mapped in the remainder of the site.

Most of the soil profiles examined within the mitigation area revealed a cumulic layer even with part of the mollic epipedon removed during excavation (Table 4a). The exceptions occurred in the western portion of the site; stratification characteristic of a young floodplain soil (entisol) was observed (Table 4b). Soil morphological features in the southern/southeastern half of the site suggest that the soils are wetter (Table 4c). Episaturation has resulted in oxidized rhizospheres in the upper profile, but no redoximorphic features were observed below 0.30 m (12 in). In these areas, the soils had cracks 1 to 4 inches deep. A few soil cores suggested that a small area of hydric soils exists on the west side of the site along the berm (east of the railroad tracks); at 10 inches the matrix color was 2.5Y 3/1 and common 7.5 YR 4.4 iron masses were present.

Soils appear to have been excavated approximately 0.6- 0.9 m (24-36 in). Based on morphological features in the upper 12 inches, most of the soils present at the site were moderately well drained to well drained. Currently, the soils do not exhibit redoximorphic features in the upper profile and cannot be considered hydric. However, in 1999, two large portions of the site were inundated: one is fed by the ditch to the north and the other by the stream to the south. Hydrology appeared favorable for the development of hydric soil characteristics. At the time of the survey in 2000, neither surface saturated soils nor standing water were observed at the site.

Table 4a. Typical profile description for the north-central portion of FAS 67 wetland mitigation site.

| Depth    | Description  |
|----------|--|
| 0-8 in   | 10YR 3/2, silt loam, granular to mostly subangular blocky                        |
| 8-20 in  | 5Y 2.5/1, silt loam, subangular blocky, few 7.5YR 4/4 iron masses begin at 12 in |
| 20-24 in | 10YR 3/1, silt loam, massive, few, fine, 10YR 4/3 iron masses                    |
| 24-36 in | 5Y 3/1, 10YR 4/3, 10YR 4/2, silt loam, massive                                   |

Table 4b. Typical profile description for the western portion of FAS 67 wetland mitigation site.

| Depth    | Description  |
|----------|--|
| 0-6 in   | 5Y 3/1, silt loam, massive, oxidized rhizospheres, 7.5YR 4/4 iron masses |
| 6-12 in  | 2.5Y 2.5/1, silt loam, massive, 7.5YR 4/4 iron masses                    |
| 12-20 in | 2.5Y 3/2, silt loam, few to common, fine, 10YR 4/3 iron masses           |
| 20-21 in | 2.5Y 6/3, thin sand lense  |
| 21-30 in | 5Y 4/2, silt loam, common 7.5YR 3/4 iron masses                          |

Table 4c. Typical profile description for the southeastern portion of FAS 67 wetland mitigation site.

| Depth    | Description  |
|----------|--|
| 0-12 in  | 2.5Y 3/2, silt loam, weak granular structure, many 7.5YR 4/4 oxidized rhizospheres within 6 in of soil surface |
| 12-20 in | 2.5Y 3/2, silt loam, massive   |

c) Presence of wetland hydrology

Field evidence of wetland hydrology included the excavated depressional landscape position and observations by ISGS personnel (Carr and Weaver 2000). Wells were established in fall 1999, but observations of site saturation and inundation in relation to monthly precipitation were conducted previously (Fucciolo *et al.* 1999). Observations in 2000 suggest that 1.8 ha (4.5 acres) of the site met the wetland hydrology criterion.

At the time of the INHS survey, we did not observe direct evidence of inundation or saturation, as we had in 1999 (Tessene and Coopridner 2000). During our survey, we noted that water that used to enter the site from the north appeared to be diverted down a ditch that was constructed parallel to the north edge of the wetland site at the base of the slope of footings for the Stagecoach Trail bridge. The wetland had received some hydrologic input from water draining from a groundwater-fed marsh (Site 2, Tessene and Harrold 1994) that was disturbed during construction of the bridge. Steve Lorig of Midwest Ecological Services (pers. comm., Feb. 2001) noted that the ditch was constructed to divert roadside runoff that was previously infiltrating the fill at the base of the bridge. Lorig stated that water that drained from the marsh was now sent through a tile line to the wetland mitigation site. This should be only water that would run off the disturbed wetland in any case, and was not intended to drain the marsh. Given that information, we believe that wetland hydrology should continue to develop over much of the site.

Areas in the south part of the wetland site have hydrologic input and outflow by means of a ditch connecting the site to a ditched stream that connects with the Galena River west of the railroad tracks. This certainly contributes to the wetland hydrology of the site, but can be problematic, for there is no control structure where this ditch enters the site. A control structure can be used to regulate input, output, and duration of flooding from the stream, and would prevent erosion at the point where the ditch enters the site.

## Project Goal 2

### a) Survival of planted herbs

Lorig (1999) observed cover of planted species in each planting station, and noted that most species appeared to be flourishing. At that time, the performance standards for these plantings were met, and only a few species were not observed.

Our observations in 2000 agreed that the cover in the plantings exceeded performance standards. We did not directly sample any of the plantings, but we observed all planted species (Table 1 above) except *Calamagrostis* on the site, and that the species had spread beyond the planting enclosures by seed and vegetative means.

The planted species seem to be suitable for the site conditions, and generally desirable species. One possible exception (noted last year as well) may be *Iris versicolor*, a species native in the northern Midwest and in the northeastern United States and adjacent Canada, but not found in Illinois. Perhaps the plants are the closely related, native, *Iris shrevei* (*Iris virginica* var. *shrevei*) which also occurs in Wisconsin, where a number of nurseries that supply wetland plants are located. The best way to properly distinguish the two species is to observe them in bloom. We did not observe the plants in bloom, but did find some plants with young fruits. Results were inconclusive.

Steve Lorig (pers. comm. Feb. 2001) observed that a widely distributed species on the wetland site outside the planting areas, *Carex trichocarpa*, was originally installed on the site as plugs removed from the disturbed marsh (Site 2, Tessene and Harrold 1994). The sedge was moved as large sections of turf that were split up and scattered on the site the following spring after overwintering on the site under shallowly flooded conditions.

### b) Abundance and cover of native species

During a survey of naturally occurring plant species on the wetland creation site, 73 native and 14 non-native species were observed (see Appendix 1), including ten planted species that spread beyond the planting areas. This compares with 36 native and 14 non-native species observed in 1999 (Tessene and Coopridge 1999). Therefore, 84% of the species are native to Illinois. Non-native species are expected to diminish in importance as site conditions stabilize. The FQI value for the site was 22.9 with a mean C value of 2.7, (18.8 and 2.4, respectively, not including planted species that have spread to become part of the vegetation of the site) indicating good natural quality and the potential to become an environmental asset.

Vegetation sampling on the site (Table 5) included 39 species, including 32 native and 7 non-native species. Overall, the increase in the number of species and a more even distribution bodes well for the development of vegetation on the site. Native species made up 82% of the number of species (77% in 1999, Appendix 2) and 73.2% of importance values (87.5% in 1999). Nearly all species can be considered hydrophytic. The exceptions are opportunistic species sometimes found in the drier parts of disturbed wetlands, which occupied less than 5% of relative frequency and relative cover.

Bare areas were noted in 19.4% of quadrats, but averaged 6.1% (compared with 83.3% and 19.4%, respectively, in 1999). Hence, 93.9% cover of hydrophytic vegetation is present, meeting project standards. Annual species (18 of 39, or 46%, versus 11 of 26, or 42%, in 1999) included 55.6% of importance values (compared with 43.7% in 1999). Much of the increase in annual species is from two dominant species, *Polygonum hydropiper* and *Bidens tripartita*. Woody species (4 of 39) include 9.6% of importance values (compared with 12.5% in 1999). The main contributor

is *Salix nigra*, which is being controlled to prevent the site becoming a floodplain forest rather than an herbaceous wetland.

Table 5 below provides the results of vegetation sampling in the wetland creation site. Information provided includes percent frequency, relative frequency, average percent cover, relative cover, and importance value for each species. A list of all plant species observed in the wetland site is presented in Appendix 1.

Table 5. Results of vegetation sampling at a wetland creation site near the Galena River bridge, 2000.

| Species                         | Freq.(%) | Rel.freq.(%) | Ave. Cover(%) | Rel. Cover(%) | IV     |
|---------------------------------|----------|--------------|---------------|---------------|--------|
| <i>Polygonum hydropiper</i>     | 69.44    | 9.92         | 22.07 -       | 11.50         | 10.71  |
| <i>Rorippa islandica</i>        | 69.44    | 9.92         | 16.65         | 8.68          | 9.30   |
| <i>Bidens tripartita</i>        | 58.33    | 8.33         | 18.99 -       | 9.89          | 9.11   |
| <i>Rumex crispus</i>            | 58.33    | 8.33         | 17.67 -       | 9.20          | 8.77   |
| <i>Eleocharis erythropoda</i>   | 27.77    | 3.97         | 15.56         | 8.10          | 6.04   |
| <i>Salix nigra</i>              | 33.33    | 4.76         | 11.75         | 6.12          | 5.44   |
| <i>Leersia oryzoides</i>        | 33.33    | 4.76         | 9.19          | 4.79          | 4.78   |
| <i>Echinochloa muricata</i>     | 27.77    | 3.97         | 10.58         | 5.51          | 4.74   |
| <i>Carex trichocarpa</i>        | 25.00    | 3.57         | 5.36          | 2.79          | 3.18   |
| <i>Bidens cernua</i>            | 27.77    | 3.97         | 4.08          | 2.13          | 3.05   |
| <i>Polygonum lapathifolium</i>  | 25.00    | 3.57         | 3.42          | 1.78          | 2.68   |
| <i>Acer negundo</i>             | 30.56    | 4.37         | 1.25          | 0.65          | 2.51   |
| <i>Polygonum pennsylvanicum</i> | 19.44    | 2.78         | 3.90          | 2.03          | 2.41   |
| <i>Phalaris arundinacea</i>     | 16.67    | 2.38         | 4.38          | 2.28          | 2.33   |
| <i>Glyceria grandis</i>         | 8.33     | 1.19         | 5.49          | 2.86          | 2.02   |
| <i>Helenium autumnale</i>       | 13.89    | 1.98         | 3.96          | 2.06          | 2.02   |
| <i>Polygonum persicaria</i>     | 16.67    | 2.38         | 3.08          | 1.61          | 1.99   |
| <i>Conzys canadensis</i>        | 16.67    | 2.38         | 2.46          | 1.28          | 1.83   |
| <i>Polygonum punctatum</i>      | 11.11    | 1.59         | 3.61          | 1.88          | 1.73   |
| <i>Setaria faberi</i>           | 11.11    | 1.59         | 3.28          | 1.71          | 1.65   |
| <i>Ambrosia trifida</i>         | 5.55     | 0.79         | 4.72          | 2.46          | 1.63   |
| <i>Amaranthus tuberculatus</i>  | 13.89    | 1.98         | 1.71          | 0.89          | 1.44   |
| <i>Bidens vulgata</i>           | 8.33     | 1.19         | 3.19          | 1.66          | 1.43   |
| <i>Rumex altissimus</i>         | 8.33     | 1.19         | 3.19          | 1.66          | 1.43   |
| <i>Populus deltoides</i>        | 11.11    | 1.59         | 1.63          | 0.85          | 1.22   |
| <i>Cyperus esculentus</i>       | 8.33     | 1.19         | 0.92          | 0.48          | 0.83   |
| <i>Bidens frondosa</i>          | 8.33     | 1.19         | 0.58          | 0.30          | 0.75   |
| <i>Kochia scoparia</i>          | 5.55     | 0.79         | 1.13          | 0.59          | 0.69   |
| <i>Agrostis alba</i>            | 2.78     | 0.40         | 1.74          | 0.90          | 0.65   |
| <i>Carex vulpinoidea</i>        | 2.78     | 0.40         | 1.74          | 0.90          | 0.65   |
| <i>Glechoma hederacea</i>       | 2.78     | 0.40         | 1.74          | 0.90          | 0.65   |
| <i>Salix amygdaloides</i>       | 2.78     | 0.40         | 1.04          | 0.54          | 0.47   |
| <i>Carex cristatella</i>        | 2.78     | 0.40         | 0.42          | 0.22          | 0.31   |
| <i>Cyperus strigosus</i>        | 2.78     | 0.40         | 0.42          | 0.22          | 0.31   |
| <i>Mentha arvensis</i>          | 2.78     | 0.40         | 0.42          | 0.22          | 0.31   |
| <i>Solanum carolinianum</i>     | 2.78     | 0.40         | 0.42          | 0.22          | 0.31   |
| <i>Erigeron annuus</i>          | 2.78     | 0.40         | 0.08          | 0.04          | 0.22   |
| <i>Pilea pumila</i>             | 2.78     | 0.40         | 0.08          | 0.04          | 0.22   |
| <i>Verbena hastata</i>          | 2.78     | 0.40         | 0.08          | 0.04          | 0.22   |
| Total                           | 700.00   | 100.00       | 191.98        | 100.00        | 100.00 |



c) Dominant plant species

*Rumex crispus*, *Rorippa islandica*, and *Salix nigra* are species that is dominant in both 1999 and 2000 (see Appendix 2 for 1999 results). *Polygonum hydropiper* and *Bidens tripartita* are annuals that were responding to the still unsettled, yet wetland, conditions. *Amaranthus*, a dominant in 1999, likely was outcompeted by other, more persistent, species. *Salix nigra* was the subject of control measures in an attempt to limit its increase. Two other common species, *Eleocharis erythropoda* and *Leersia oryzoides*, also increased during 2000. Overall, species richness was more evenly distributed.

The fact that *Polygonum hydropiper* was the most frequently encountered species and had the most relative cover of the sampled species goes against the goal that the three most dominant species all be natives. However, because the plant is an annual, it is likely to become less dominant as site conditions stabilize.

*Phalaris*, *Typha*, and *Salix exigua* are present on the site, but are not dominants. Efforts to control these species have been ongoing, and need to continue. For long-term control of these species, it may be necessary to also control these aggressive species in neighboring wetland areas.

### Project Goal 3

Steve Lorig (pers. comm. 2000) stated that prairie was planted in the buffer area around the wetland site in fall 1999. Soils in the buffer area appeared compacted, and the sparse vegetation was dominated by weedy species. Planted species were not yet evident. Vegetation should be established in the buffer area to decrease erosion and help filter runoff entering the wetland site.

We recorded 42 planted trees along the north and northeast parts of the buffer. Many appeared to be stressed, and some of these may not continue to survive. Species present (and number of individuals encountered) included *Juglans nigra* (8), *Platanus occidentalis* (6), *Populus deltoides* (6), *Quercus bicolor* (10), *Q. palustris* (7), and *Ulmus americana* (12). Apparently, more elms were planted, since only 4 were noted in 1999, but the number of other trees remained similar. One dead sycamore and one dead unidentified tree were noted. The planted trees may need supplemental water in the coming year, especially if the weather remains dry.

### Recommendations

With the restoration of incoming water from the disturbed wetland to the east, via a tile line (noted under "presence of wetland hydrology," Project Goal 1), development of wetland hydrology on the site should continue. A control structure at the ditch at the south end of the site could be used to regulate the depth and duration of flooding from water supplied from the ditched stream along the south border of the site, and would prevent erosion caused by fluctuating water levels. Hydric soil development appears slow on the wetland site, but will eventually come under the proper hydrologic conditions.

In general, unplanted species in the wetland basin are meeting performance standards. Most annual and non-native species will tend to decrease in cover as succession occurs on the site. The site currently meets criteria for vegetation cover (94%) and the proportion of native species (84%). However, the presence of *Polygonum hydropiper* and *Rumex crispus*, two non-native species, as dominant species goes against project goals stating that the most dominant species be native.

Overall planted herbaceous species cover in the wetland basin met performance standards, since the species that survived the initial planting have spread outside the planting beds. The prairie buffer around the wetland site was planted, but was not yet visible. The buffer plantings require further monitoring. Planted trees in the buffer appeared stressed, and may require continued care.

Unplanted herbaceous species in the planned wetland basin are species that tolerate disturbance, as one might expect on a recently created site. *Typha* and *Phalaris* are present but not dominant; further monitoring and continued control are necessary. In the future, control efforts may need to expand into adjacent wetlands off the property where these species are common and can contribute propagules to the constructed wetland site. For instance, *Typha* is a dominant in a wetland east of the site (Appendix 4). This wetland, the former Site 2 in Tessene and Harrold (1994), contributes water to the constructed wetland site. *Phalaris* and *Salix exigua* are very common in a wetland southeast of the site across the ditched stream (Appendix 3). Although both of these sites are degraded and are dominated by weedy species, they do contain some native species not found in the constructed wetland site, such as some sedges, *Lycopus americanus*, and *Hypericum pyramidatum*.

*Salix nigra*, a common species in the constructed wetland basin, could change the character of the mitigation site from an herbaceous wetland to a floodplain forest if allowed to dominate the site. Continued control of this species by weeding, mowing, herbicide use, or controlled burns may be necessary to maintain the site as an herbaceous wetland, if this continues to be the goal.

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**Appendix 1**  
**ROUTINE ONSITE WETLAND DETERMINATION**  
Site 1 (page 1 of 4)

Field Investigators: Tessene, Coopridge, and Marcum      Date: 9 August 2000  
Section No.: 88-00094-00-BR      Project Name: FAS 67 (Stagecoach Trail)  
State: Illinois      County: Jo Daviess      Applicant: IDOT District 2  
Site name: Marsh  
Legal Description: NE/4, SE/4, sec. 16, T.28N., R.1E.  
Location: Excavated part of wetland restoration/creation site south of the bridge over the  
Galena River on Stagecoach Trail

Do normal environmental conditions exist at this site?      Yes: X      No:  
Has the vegetation, soils, or hydrology been significantly disturbed?      Yes:      No: X

**VEGETATION**

| <u>Dominant Plant Species</u>    | <u>Indicator Status</u> | <u>Stratum</u> |
|----------------------------------|-------------------------|----------------|
| 1. <i>Bidens tripartita</i>      | FACW                    | herb           |
| 2. <i>Eleocharis erythropoda</i> | OBL                     | herb           |
| 3. <i>Polygonum hydropiper</i>   | OBL                     | herb           |
| 4. <i>Rorippa islandica</i>      | OBL                     | herb           |
| 5. <i>Rumex crispus</i>          | FAC+                    | herb           |
| 6. <i>Salix nigra</i>            | OBL                     | herb           |

Percentage of dominant species that are OBL, FACW, FAC+, or FAC: 100%

**Hydrophytic vegetation:** Yes: X      No:

**Rationale:** More than 50% of the dominants are OBL, FACW, FAC+, or FAC.

**SOILS** (representative profile for the majority of the site)

Series and phase: Undetermined

On Jo Daviess County hydric soils list?      Yes:      No: X

Is the soil a histosol?      Yes:      No: X      Histic epipedon present?      Yes:      No: X

Redox Concentrations?      Yes:      No: X      Redox Depletions?      Yes:      No: X

Matrix color: 2.5Y 3/1

Other hydric soil indicators: None

**Hydric soils:** Yes:      No: X

**Rationale:** This soil lacks obvious redoximorphic features in the upper profile.  
This indicates that it is not saturated long enough for anaerobic  
conditions to occur in the upper profile.

**HYDROLOGY**

Inundated:      Yes:      No: X      Depth of standing water: None

Depth to saturated soil: More than 1.2 m (48 in)

Overview of hydrologic flow through system: Precipitation and sheet flow contribute water to this site. Especially important are stream flow from a tile line leading from a spring northeast of the site, and overflow through an inlet connecting to a stream south of the site. Water leaves the site by evapotranspiration and drainage to the stream.

Size of watershed: Less than 2.6 km<sup>2</sup> (1.0 mi<sup>2</sup>)

Other field evidence observed: This site is an excavated depression. We observed wetland drainage patterns and areas that appeared to have been ponded or saturated earlier in the year. Direct and indirect observations by ISGS personnel suggest that much of the site has wetland hydrology.

**Wetland hydrology:** Yes: X      No:

**Rationale:** Low landscape position and the observations of inundated and saturated areas suggest that wetland hydrology is developing on the site.

## ROUTINE ONSITE WETLAND DETERMINATION

Site 1 (page 2 of 4)

Field Investigators: Tessene, Coopridger, and Marcum      Date: 9 August 2000  
 Section No.: 88-00094-00-BR      Project Name: FAS 67 (Stagecoach Trail)  
 State: Illinois      County: Jo Daviess      Applicant: IDOT District 2  
 Site name: Marsh  
 Legal Description: NE/4, SE/4, sec. 16, T.28N., R.1E.  
 Location: Excavated part of wetland restoration/creation site south of the bridge over the  
 Galena River on Stagecoach Trail

### WETLAND DETERMINATION AND RATIONALE

Is the site a wetland? Undetermined

**Rationale:** Although dominant hydrophytic vegetation is present and wetland hydrology is developing, hydric soil development has not yet occurred. With the continued presence of wetland hydrology, hydric soils should develop. The site is not included in the NWI.

### SPECIES LIST

| Scientific name                 | Common name          | Stratum | Wetland Indicator | C* |
|---------------------------------|----------------------|---------|-------------------|----|
| <i>Abutilon theophrasti</i>     | velvetleaf           | herb    | FACU-             | ** |
| <i>Acer negundo</i>             | box elder            | herb    | FACW-             | 1  |
| <i>Agropyron repens</i>         | quack grass          | herb    | FACU              | ** |
| <i>Agrostis alba</i>            | redtop               | herb    | FACW              | 0  |
| <i>Alisma plantago-aquatica</i> | water plantain       | herb    | OBL               | 2  |
| <i>Amaranthus retroflexus</i>   | pigweed              | herb    | FACU+             | ** |
| <i>Amaranthus tuberculatus</i>  | water hemp           | herb    | OBL               | 1  |
| <i>Ambrosia artemisiifolia</i>  | common ragweed       | herb    | FACU              | 0  |
| <i>Ambrosia trifida</i>         | giant ragweed        | herb    | FAC+              | 0  |
| <i>Apocynum sibiricum</i>       | prairie dogbane      | herb    | FAC+              | 2  |
| <i>Asclepias incarnata</i>      | swamp milkweed       | herb    | OBL               | 4  |
| <i>Aster praealtus</i>          | willow-leaved aster  | herb    | OBL               | 4  |
| <i>Aster simplex</i>            | panicled aster       | herb    | FACW              | 3  |
| <i>Artemesia biennis</i>        | biennial wormwood    | herb    | FACW-             | ** |
| <i>Bidens cernua</i>            | nodding bur-marigold | herb    | OBL               | 2  |
| <i>Bidens frondosa</i>          | beggar's ticks       | herb    | FACW              | 1  |
| <i>Bidens tripartita</i>        | beggar's ticks       | herb    | FACW              | 2  |
| <i>Bidens vulgata</i>           | tall beggar's ticks  | herb    | FACW              | 0  |
| <i>Calystegia sepium</i>        | hedge bindweed       | herb    | FAC               | 1  |
| <i>Campanula americana</i>      | tall bellflower      | herb    | FAC               | 4  |
| <i>Carex annectens</i>          | sedge                | herb    | FACW              | 3  |
| <i>Carex comosa</i>             | sedge                | herb    | OBL               | 5  |
| <i>Carex cristatella</i>        | sedge                | herb    | FACW+             | 3  |
| <i>Carex hystricina</i>         | bottlebrush sedge    | herb    | OBL               | 6  |
| <i>Carex stipata</i>            | sedge                | herb    | OBL               | 2  |
| <i>Carex stricta</i>            | hummock sedge        | herb    | OBL               | 5  |
| <i>Carex trichocarpa</i>        | sedge                | herb    | OBL               | 6  |
| <i>Carex vulpinoidea</i>        | fox sedge            | herb    | OBL               | 3  |
| <i>Carex</i> sp.                | sedge                | herb    | -                 | -  |
| <i>Conyza canadensis</i>        | horseweed            | herb    | FAC-              | 0  |

\* Coefficient of Conservatism (see introduction)  
 (Species list continues on next page)

\*\* Species not native to Illinois

## ROUTINE ONSITE WETLAND DETERMINATION

Site 1 (page 3 of 4)

Field Investigators: Tessene, Coopridger, and Marcum      Date: 9 August 2000  
 Section No.: 88-00094-00-BR      Project Name: FAS 67 (Stagecoach Trail)  
 State: Illinois      County: Jo Daviess      Applicant: IDOT District 2  
 Site name: Marsh  
 Legal Description: NE/4, SE/4, sec. 16, T.28N., R.1E.  
 Location: Excavated part of wetland restoration/creation site south of the bridge over the  
 Galena River on Stagecoach Trail

### SPECIES LIST (concluded)

| Scientific name                | Common name          | Stratum     | Wetland Indicator | C* |
|--------------------------------|----------------------|-------------|-------------------|----|
| <i>Cyperus esculentus</i>      | yellow nutsedge      | herb        | FACW              | 0  |
| <i>Cyperus strigosus</i>       | straw nutsedge       | herb        | FACW              | 0  |
| <i>Echinochloa muricata</i>    | barnyard grass       | herb        | OBL               | 0  |
| <i>Eleocharis erythropoda</i>  | spikerush            | herb        | OBL               | 3  |
| <i>Epilobium coloratum</i>     | cinnamon willow-herb | herb        | OBL               | 3  |
| <i>Erigeron annuus</i>         | daisy fleabane       | herb        | FAC-              | 1  |
| <i>Erigeron strigosus</i>      | daisy fleabane       | herb        | FAC-              | 2  |
| <i>Eupatorium maculatum</i>    | spotted Joe-Pye weed | herb        | OBL               | 5  |
| <i>Eupatorium perfoliatum</i>  | boneset              | herb        | FACW+             | 4  |
| <i>Glechoma hederacea</i>      | creeping Charlie     | herb        | FACU              | ** |
| <i>Glyceria grandis</i>        | tall manna grass     | herb        | OBL               | 10 |
| <i>Helenium autumnale</i>      | sneezeweed           | herb        | FACW+             | 3  |
| <i>Helianthus tuberosus</i>    | Jerusalem artichoke  | herb        | FAC               | 3  |
| <i>Impatiens capensis</i>      | orange jewelweed     | herb        | FACW              | 2  |
| <i>Iris shrevei</i>            | blue flag iris       | herb        | OBL               | 5  |
| <i>Juncus torreyi</i>          | rush                 | herb        | FACW              | 3  |
| <i>Kochia scoparia</i>         | summer cypress       | herb        | FACU-             | ** |
| <i>Lactuca serriola</i>        | prickly lettuce      | herb        | FAC               | ** |
| <i>Leersia oryzoides</i>       | rice cutgrass        | herb        | OBL               | 3  |
| <i>Lobelia siphilitica</i>     | great blue lobelia   | herb        | FACW+             | 4  |
| <i>Lycopus americanus</i>      | bugleweed            | herb        | OBL               | 3  |
| <i>Mentha arvensis</i>         | field mint           | herb        | FACW              | 4  |
| <i>Mimulus ringens</i>         | monkey flower        | herb        | OBL               | 5  |
| <i>Oenothera biennis</i>       | evening primrose     | herb        | FACU              | 1  |
| <i>Panicum capillare</i>       | witchgrass           | herb        | FAC               | 0  |
| <i>Penthorum sedoides</i>      | ditch stonecrop      | herb        | OBL               | 2  |
| <i>Phalaris arundinacea</i>    | reed canary grass    | herb        | FACW+             | ** |
| <i>Polygonum amphibium</i>     | water smartweed      | herb        | OBL               | 3  |
| <i>Polygonum aviculare</i>     | knotweed             | herb        | FAC-              | ** |
| <i>Polygonum hydropiper</i>    | water pepper         | herb        | OBL               | ** |
| <i>Polygonum lapathifolium</i> | nodding smartweed    | herb        | FACW+             | 0  |
| <i>Polygonum pensylvanicum</i> | smooth smartweed     | herb        | FACW+             | 1  |
| <i>Polygonum persicaria</i>    | lady's-thumb         | herb        | FACW              | ** |
| <i>Polygonum scandens</i>      | climbing knotweed    | herb        | FAC               | 2  |
| <i>Populus deltoides</i>       | cottonwood           | shrub, herb | FAC+              | 2  |
| <i>Rorippa islandica</i>       | yellow marsh cress   | herb        | OBL               | 4  |
| <i>Rumex altissimus</i>        | pale dock            | herb        | FACW-             | 2  |
| <i>Rumex crispus</i>           | curly dock           | herb        | FAC+              | ** |

\* Coefficient of Conservatism (see introduction)  
 (Species list concludes on next page)

\*\* Species not native to Illinois

## ROUTINE ONSITE WETLAND DETERMINATION

Site 1 (page 4 of 4)

Field Investigators: Tessene, Coopriders, and Marcum      Date: 9 August 2000  
 Section No.: 88-00094-00-BR      Project Name: FAS 67 (Stagecoach Trail)  
 State: Illinois      County: Jo Daviess      Applicant: IDOT District 2  
 Site name: Marsh  
 Legal Description: NE/4, SE/4, sec. 16, T.28N., R.1E.  
 Location: Excavated part of wetland restoration/creation site south of the bridge over the  
 Galena River on Stagecoach Trail

### SPECIES LIST (concluded)

| Scientific name              | Common name          | Stratum     | Wetland Indicator | C * |
|------------------------------|----------------------|-------------|-------------------|-----|
| <i>Sagittaria latifolia</i>  | common arrowhead     | herb        | OBL               | 4   |
| <i>Salix amygdaloides</i>    | peachleaf willow     | shrub, herb | FACW              | 4   |
| <i>Salix exigua</i>          | sandbar willow       | shrub, herb | OBL               | 1   |
| <i>Salix nigra</i>           | black willow         | shrub, herb | OBL               | 3   |
| <i>Sambucus canadensis</i>   | elderberry           | shrub, herb | FACW-             | 2   |
| <i>Scirpus atrovirens</i>    | green bulrush        | herb        | OBL               | 4   |
| <i>Scirpus cyperinus</i>     | woolgrass            | herb        | OBL               | 5   |
| <i>Scirpus validus</i>       | soft-stemmed bulrush | herb        | OBL               | 4   |
| <i>Setaria faberi</i>        | giant foxtail        | herb        | FACU+             | **  |
| <i>Solanum carolinense</i>   | horse nettle         | herb        | FACU-             | 0   |
| <i>Solidago gigantea</i>     | late goldenrod       | herb        | FACW              | 3   |
| <i>Sparganium eurycarpum</i> | common bur-reed      | herb        | OBL               | 5   |
| <i>Spartina pectinata</i>    | prairie cordgrass    | herb        | FACW+             | 4   |
| <i>Stachys tenuifolia</i>    | hedge nettle         | herb        | FACW+             | 5   |
| <i>Typha angustifolia</i>    | narrowleaf cattail   | herb        | OBL               | **  |
| <i>Typha latifolia</i>       | common cattail       | herb        | OBL               | 1   |
| <i>Verbena hastata</i>       | blue vervain         | herb        | FACW+             | 3   |
| <i>Verbena urticifolia</i>   | white vervain        | herb        | FAC+              | 3   |
| <i>Vernonia fasciculata</i>  | prairie ironweed     | herb        | FACW              | 5   |
| <i>Xanthium strumarium</i>   | cocklebur            | herb        | FAC               | 0   |

\* Coefficient of Conservatism (see introduction)

Mean c value =  $\sum C/N = 196/73 = 2.7$

Without planted species, Mean c value =  $\sum C/N = 149/63 = 2.4$

\*\* Species not native to Illinois

$FQI = \bar{C} \sqrt{N} = (2.7) \sqrt{73} = 22.9$

$FQI = \bar{C} \sqrt{N} = (2.4) \sqrt{63} = 18.8$

Determined by: Paul Tessene and Paul Marcum (vegetation and hydrology)  
 Mary Coopriders (soils and hydrology)  
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**Appendix 2: Results of vegetation sampling in 1999 at a wetland creation site near the Galena River bridge.**

| Species                        | Freq.(%)     | Rel.freq.(%)  | Ave. Cover(%) | Rel. Cover(%) | IV            |
|--------------------------------|--------------|---------------|---------------|---------------|---------------|
| <i>Salix nigra</i>             | 52.8         | 16.24         | 21.65         | 20.84         | 18.54         |
| <i>Rorippa islandica</i>       | 58.3         | 17.95         | 18.13         | 17.44         | 17.70         |
| <i>Amaranthus tuberculatus</i> | 27.8         | 8.55          | 9.04          | 8.70          | 8.62          |
| <i>Rumex crispus</i>           | 27.8         | 8.55          | 6.07          | 5.84          | 7.19          |
| <i>Eleocharis erythropoda</i>  | 13.9         | 4.27          | 6.60          | 6.35          | 5.31          |
| <i>Echinochloa muricata</i>    | 13.9         | 4.27          | 5.97          | 5.75          | 5.01          |
| <i>Cyperus esculentus</i>      | 16.7         | 5.13          | 4.74          | 4.56          | 4.84          |
| <i>Leersia oryzoides</i>       | 13.9         | 4.27          | 5.28          | 5.08          | 4.68          |
| <i>Panicum dichotomiflorum</i> | 13.9         | 4.27          | 4.72          | 4.54          | 4.41          |
| <i>Populus deltoides</i>       | 19.4         | 5.98          | 1.92          | 1.84          | 3.91          |
| <i>Rumex altissimus</i>        | 11.1         | 3.42          | 3.54          | 3.41          | 3.41          |
| <i>Bidens cernua</i>           | 8.3          | 2.56          | 3.82          | 3.68          | 3.12          |
| <i>Phalaris arundinacea</i>    | 5.6          | 1.71          | 1.46          | 1.40          | 1.56          |
| <i>Carex trichocarpa</i>       | 5.6          | 1.71          | 0.83          | 0.80          | 1.26          |
| <i>Carex</i> sp.               | 5.6          | 1.71          | 0.83          | 0.80          | 1.26          |
| <i>Polygonum persicaria</i>    | 2.8          | 0.85          | 1.74          | 1.67          | 1.26          |
| <i>Apocynum sibiricum</i>      | 2.8          | 0.85          | 1.04          | 1.00          | 0.93          |
| <i>Atriplex patula</i>         | 2.8          | 0.85          | 1.04          | 1.00          | 0.93          |
| <i>Carex vulpinoidea</i>       | 2.8          | 0.85          | 1.04          | 1.00          | 0.93          |
| <i>Helenium autumnale</i>      | 2.8          | 0.85          | 1.04          | 1.00          | 0.93          |
| <i>Polygonum hydropiper</i>    | 2.8          | 0.85          | 1.04          | 1.00          | 0.93          |
| <i>Salix exigua</i>            | 2.8          | 0.85          | 1.04          | 1.00          | 0.93          |
| <i>Bidens tripartita</i>       | 2.8          | 0.85          | 0.42          | 0.40          | 0.63          |
| <i>Glyceria grandis</i>        | 2.8          | 0.85          | 0.42          | 0.40          | 0.63          |
| <i>Setaria faberi</i>          | 2.8          | 0.85          | 0.42          | 0.40          | 0.63          |
| <i>Panicum capillare</i>       | 2.8          | 0.85          | 0.08          | 0.08          | 0.47          |
| <b>Total</b>                   | <b>325.0</b> | <b>100.00</b> | <b>103.92</b> | <b>100.00</b> | <b>100.00</b> |

**Appendix 3: Plant species observed in disturbed wetland south of the wetland mitigation site**

| Scientific name              | Common name          | Stratum        | Wetland Indicator | C* |
|------------------------------|----------------------|----------------|-------------------|----|
| <i>Acer negundo</i>          | box elder            | sapling, shrub | FACW-             | 1  |
| <i>Agrostis alba</i>         | redtop               | herb           | FACW              | 0  |
| <i>Ambrosia trifida</i>      | giant ragweed        | herb           | FAC+              | 0  |
| <i>Bidens cernua</i>         | nodding bur-marigold | herb           | OBL               | 2  |
| <i>Carex cristatella</i>     | sedge                | herb           | FACW+             | 3  |
| <i>Carex trichocarpa</i>     | sedge                | herb           | OBL               | 6  |
| <i>Carex vulpinoidea</i>     | fox sedge            | herb           | OBL               | 3  |
| <i>Hypericum pyramidatum</i> | giant St. Johnswort  | herb           | FAC+              | 8  |
| <i>Juncus dudleyi</i>        | rush                 | herb           | FAC+              | 4  |
| <i>Leersia oryzoides</i>     | rice cutgrass        | herb           | OBL               | 3  |
| <i>Lycopus americanus</i>    | bugleweed            | herb           | OBL               | 3  |
| <i>Myosoton aquaticum</i>    | giant chickweed      | herb           | FAC+              | ** |
| <i>Phalaris arundinacea</i>  | reed canary grass    | herb           | FACW+             | ** |
| <i>Phleum pratense</i>       | timothy              | herb           | FACU              | ** |
| <i>Poa pratensis</i>         | Kentucky bluegrass   | herb           | FAC-              | ** |
| <i>Polygonum hydropiper</i>  | water pepper         | herb           | OBL               | ** |
| <i>Salix exigua</i>          | sandbar willow       | sapling, shrub | OBL               | 1  |
| <i>Sambucus canadensis</i>   | elderberry           | shrub          | FACW-             | 2  |
| <i>Solidago canadensis</i>   | Canada goldenrod     | herb           | FACU              | 1  |
| <i>Verbena hastata</i>       | blue vervain         | herb           | FACW+             | 3  |
| <i>Verbena urticifolia</i>   | white vervain        | herb           | FAC+              | 3  |
| <i>Vernonia fasciculata</i>  | prairie ironweed     | herb           | FACW              | 5  |

\* Coefficient of Conservatism (see introduction)

\*\* Species not native to Illinois

Mean c-value =  $\sum C/N = 48/17 = 2.8$

FQI =  $\bar{C} \sqrt{N} = (2.8)\sqrt{17} = 11.6$



## Appendix 2

### Plant species observed in disturbed marsh east of the wetland mitigation site, August 2000

| Scientific name                 | Common name          | Stratum | Wetland Indicator | C* |
|---------------------------------|----------------------|---------|-------------------|----|
| <i>Agrostis alba</i>            | redtop               | herb    | FACW              | 0  |
| <i>Ambrosia trifida</i>         | giant ragweed        | herb    | FAC+              | 0  |
| <i>Asclepias incarnata</i>      | swamp milkweed       | herb    | OBL               | 4  |
| <i>Asclepias syriaca</i>        | common milkweed      | herb    | UPL               | 0  |
| <i>Aster simplex</i>            | panicked aster       | herb    | FACW              | 3  |
| <i>Bidens cernua</i>            | nodding bur-marigold | herb    | OBL               | 2  |
| <i>Carex hystrix</i>            | bottlebrush sedge    | herb    | OBL               | 6  |
| <i>Carex trichocarpa</i>        | sedge                | herb    | OBL               | 6  |
| <i>Cirsium arvense</i>          | creeping thistle     | herb    | FACU              | ** |
| <i>Cirsium vulgare</i>          | bull thistle         | herb    | FACU-             | ** |
| <i>Cyperus esculentus</i>       | yellow nutsedge      | herb    | FACW              | 0  |
| <i>Echinochloa muricata</i>     | barnyard grass       | herb    | OBL               | 0  |
| <i>Eleocharis erythropoda</i>   | spikerush            | herb    | OBL               | 3  |
| <i>Epilobium coloratum</i>      | cinnamon willow-herb | herb    | OBL               | 3  |
| <i>Erechtites hieracifolia</i>  | fireweed             | herb    | FACU              | 2  |
| <i>Eupatorium perfoliatum</i>   | boneset              | herb    | FACW+             | 4  |
| <i>Glyceria striata</i>         | fowl manna grass     | herb    | OBL               | 4  |
| <i>Helenium autumnale</i>       | sneezeweed           | herb    | FACW+             | 3  |
| <i>Helianthus tuberosus</i>     | Jerusalem artichoke  | herb    | FAC               | 3  |
| <i>Heracleum lanatum</i>        | cow parsnip          | herb    | FACW              | 6  |
| <i>Impatiens capensis</i>       | orange jewelweed     | herb    | FACW              | 2  |
| <i>Juncus dudleyi</i>           | rush                 | herb    | FAC+              | 4  |
| <i>Lycopus americanus</i>       | bugleweed            | herb    | OBL               | 3  |
| <i>Mentha arvensis</i>          | field mint           | herb    | FACW              | 4  |
| <i>Mimulus ringens</i>          | monkey flower        | herb    | OBL               | 5  |
| <i>Polygonum amphibium</i>      | water smartweed      | herb    | OBL               | 3  |
| <i>Polygonum hydropiper</i>     | water pepper         | herb    | OBL               | ** |
| <i>Ranunculus pensylvanicus</i> | bristly buttercup    | herb    | OBL               | 5  |
| <i>Rumex crispus</i>            | curly dock           | herb    | FAC+              | ** |
| <i>Sambucus canadensis</i>      | elderberry           | shrub   | FACW-             | 2  |
| <i>Scirpus atrovirens</i>       | green bulrush        | herb    | OBL               | 4  |
| <i>Setaria faberi</i>           | giant foxtail        | herb    | FACU+             | ** |
| <i>Setaria glauca</i>           | yellow foxtail       | herb    | FAC               | ** |
| <i>Silphium perfoliatum</i>     | cup-plant            | herb    | FACW-             | 4  |
| <i>Solidago canadensis</i>      | Canada goldenrod     | herb    | FACU              | 1  |
| <i>Typha angustifolia</i>       | narrowleaf cattail   | herb    | OBL               | ** |
| <i>Urtica dioica</i>            | stinging nettle      | herb    | FAC+              | 2  |
| <i>Verbena hastata</i>          | blue vervain         | herb    | FACW+             | 3  |

\* Coefficient of Conservatism (see introduction)  
Mean c value =  $\sum C/N = 91/34 = 2.7$

\*\* Species not native to Illinois  
 $FQI = \bar{C} \sqrt{N} = (2.7)\sqrt{34} = 15.6$

### Appendix 4

#### Plant species observed in disturbed marsh east of the wetland mitigation site, August 2000

| Scientific name                 | Common name          | Stratum | Wetland Indicator | C * |
|---------------------------------|----------------------|---------|-------------------|-----|
| <i>Agrostis alba</i>            | redtop               | herb    | FACW              | 0   |
| <i>Ambrosia trifida</i>         | giant ragweed        | herb    | FAC+              | 0   |
| <i>Asclepias incarnata</i>      | swamp milkweed       | herb    | OBL               | 4   |
| <i>Asclepias syriaca</i>        | common milkweed      | herb    | UPL               | 0   |
| <i>Aster simplex</i>            | panicked aster       | herb    | FACW              | 3   |
| <i>Bidens cernua</i>            | nodding bur-marigold | herb    | OBL               | 2   |
| <i>Carex hystricina</i>         | bottlebrush sedge    | herb    | OBL               | 6   |
| <i>Carex trichocarpa</i>        | sedge                | herb    | OBL               | 6   |
| <i>Cirsium arvense</i>          | creeping thistle     | herb    | FACU              | **  |
| <i>Cirsium vulgare</i>          | bull thistle         | herb    | FACU-             | **  |
| <i>Cyperus esculentus</i>       | yellow nutsedge      | herb    | FACW              | 0   |
| <i>Echinochloa muricata</i>     | barnyard grass       | herb    | OBL               | 0   |
| <i>Eleocharis erythropoda</i>   | spikerush            | herb    | OBL               | 3   |
| <i>Epilobium coloratum</i>      | cinnamon willow-herb | herb    | OBL               | 3   |
| <i>Erechtites hieracifolia</i>  | fireweed             | herb    | FACU              | 2   |
| <i>Eupatorium perfoliatum</i>   | boneset              | herb    | FACW+             | 4   |
| <i>Glyceria striata</i>         | fowl manna grass     | herb    | OBL               | 4   |
| <i>Helenium autumnale</i>       | sneezeweed           | herb    | FACW+             | 3   |
| <i>Helianthus tuberosus</i>     | Jerusalem artichoke  | herb    | FAC               | 3   |
| <i>Heracleum lanatum</i>        | cow parsnip          | herb    | FACW              | 6   |
| <i>Impatiens capensis</i>       | orange jewelweed     | herb    | FACW              | 2   |
| <i>Juncus dudleyi</i>           | rush                 | herb    | FAC+              | 4   |
| <i>Lycopus americanus</i>       | bugleweed            | herb    | OBL               | 3   |
| <i>Mentha arvensis</i>          | field mint           | herb    | FACW              | 4   |
| <i>Mimulus ringens</i>          | monkey flower        | herb    | OBL               | 5   |
| <i>Polygonum amphibium</i>      | water smartweed      | herb    | OBL               | 3   |
| <i>Polygonum hydropiper</i>     | water pepper         | herb    | OBL               | **  |
| <i>Ranunculus pensylvanicus</i> | bristly buttercup    | herb    | OBL               | 5   |
| <i>Rumex crispus</i>            | curly dock           | herb    | FAC+              | **  |
| <i>Sambucus canadensis</i>      | elderberry           | shrub   | FACW-             | 2   |
| <i>Scirpus atrovirens</i>       | green bulrush        | herb    | OBL               | 4   |
| <i>Setaria faberi</i>           | giant foxtail        | herb    | FACU+             | **  |
| <i>Setaria glauca</i>           | yellow foxtail       | herb    | FAC               | **  |
| <i>Silphium perfoliatum</i>     | cup-plant            | herb    | FACW-             | 4   |
| <i>Solidago canadensis</i>      | Canada goldenrod     | herb    | FACU              | 1   |
| <i>Typha angustifolia</i>       | narrowleaf cattail   | herb    | OBL               | **  |
| <i>Urtica dioica</i>            | stinging nettle      | herb    | FAC+              | 2   |
| <i>Verbena hastata</i>          | blue vervain         | herb    | FACW+             | 3   |

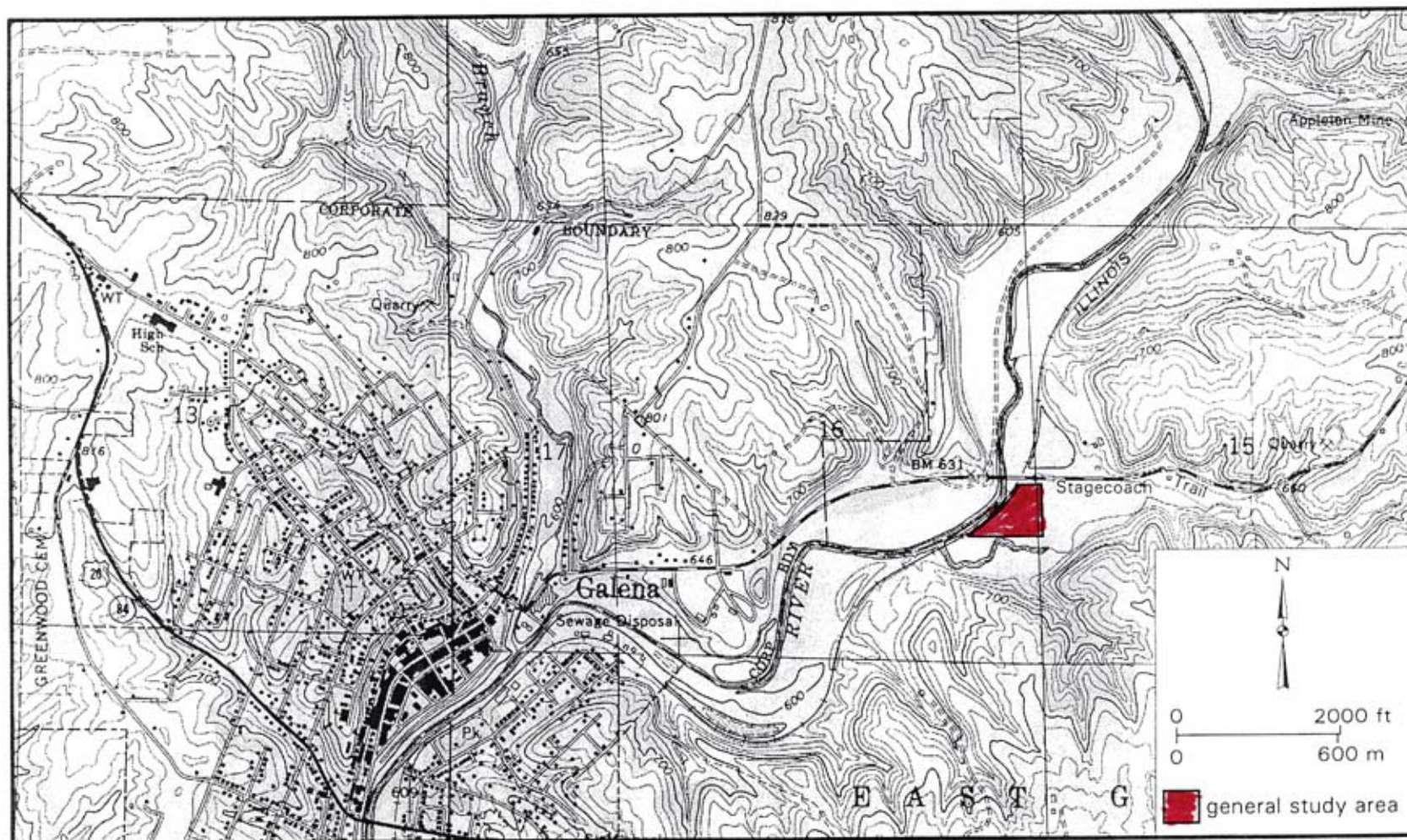
\* Coefficient of Conservatism (see introduction)  
Mean c value =  $\sum C/N = 91/34 = 2.7$

\*\* Species not native to Illinois  
 $FQI = \bar{c} \sqrt{N} = (2.7)\sqrt{34} = 15.6$

# Galena River Bridge Wetland Compensation Site (FAS Route 67)

## General Study Area and Vicinity

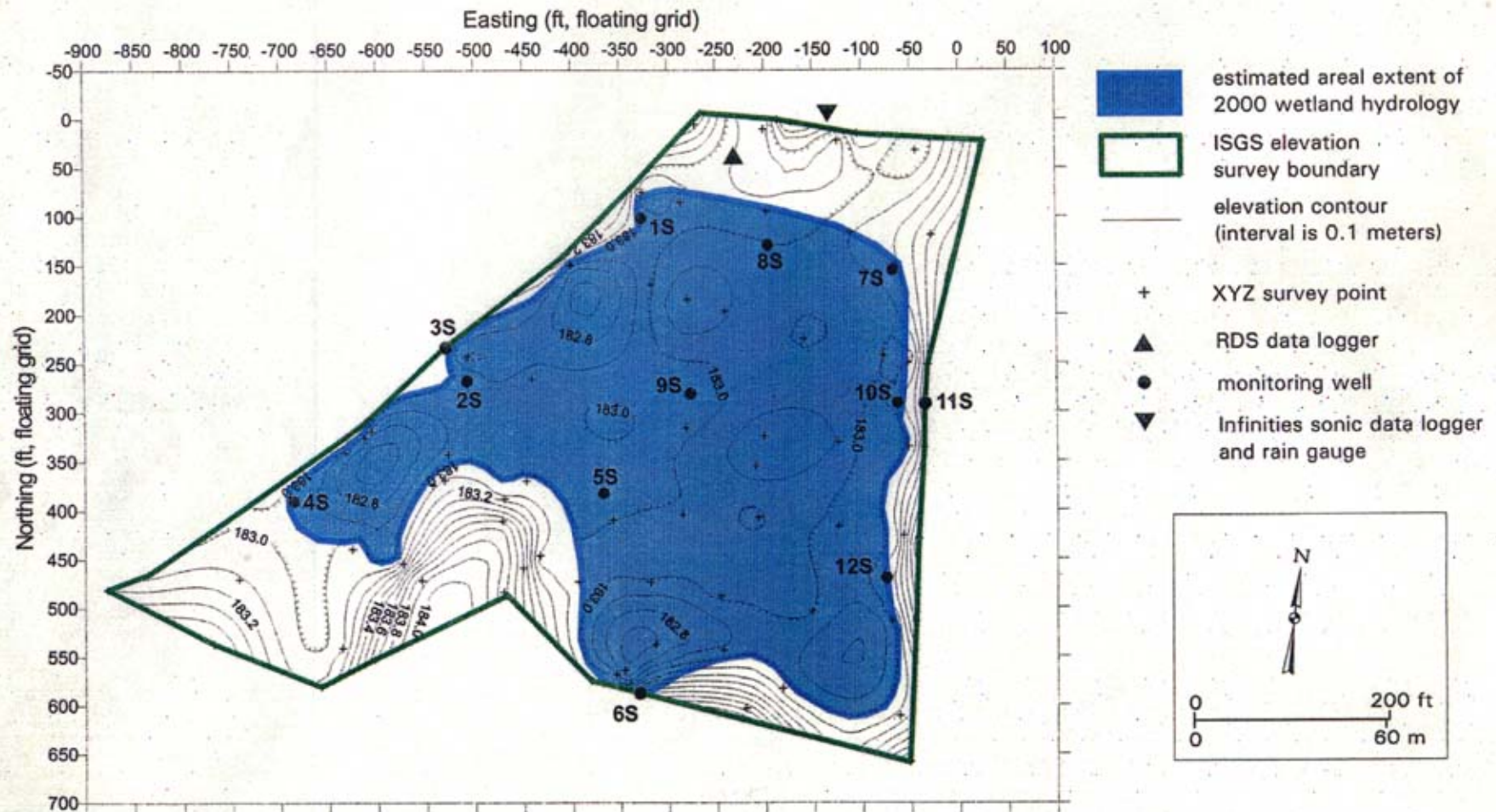
from the USGS Topographic Series, Galena, IL-Iowa 7.5 minute Quadrangle (USGS 1988)  
contour interval is 10 feet





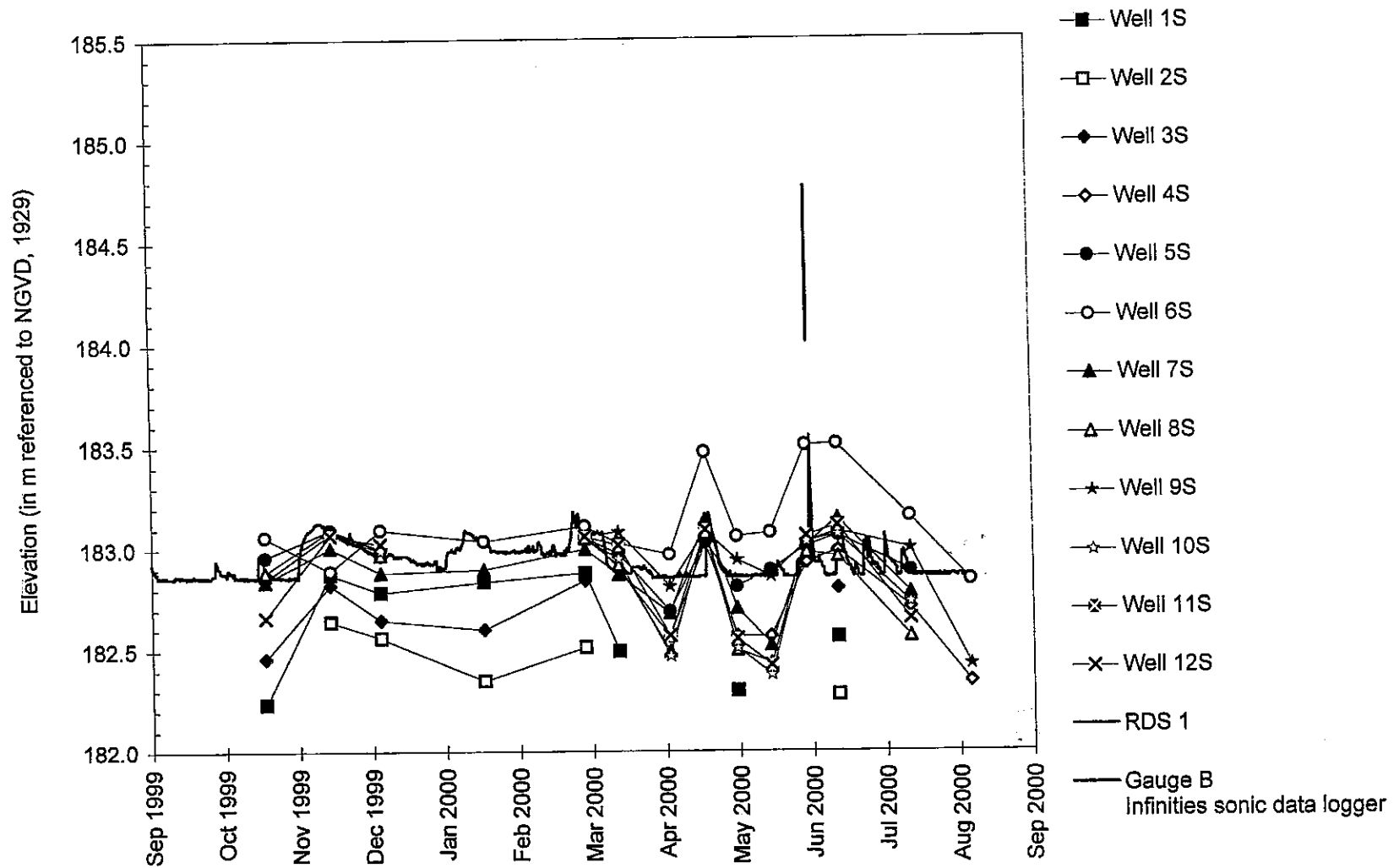
# Galena River Bridge Wetland Compensation Site (FAS Route 67)

**Estimated Areal Extent of 2000 Wetland Hydrology**  
based on data collected between September 1, 1999 and September 1, 2000  
map based on 1999 ISGS elevation survey referenced to NGVD, 1929  
contour interval is 0.1 meters



**Galena River Bridge Wetland Compensation Site**  
**September 1, 1999 to September 1, 2000**

## Water-Level Elevations



**Galena River Bridge Wetland Compensation Site**  
**September 1, 1999 to September 1, 2000**

### Depth to Water

